



A Fluor Company



INSTRUMENTS

Energy savings at a glass factory

By insertion flow meters combined
with compressor controls

Introduction



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CEO VPI Instruments

VPI Instruments offers industrial clients Energy Management Solutions for compressed air, technical gases as well as other utilities.

> 20 years experience

Compressed air in glass industry

Critical utility for production

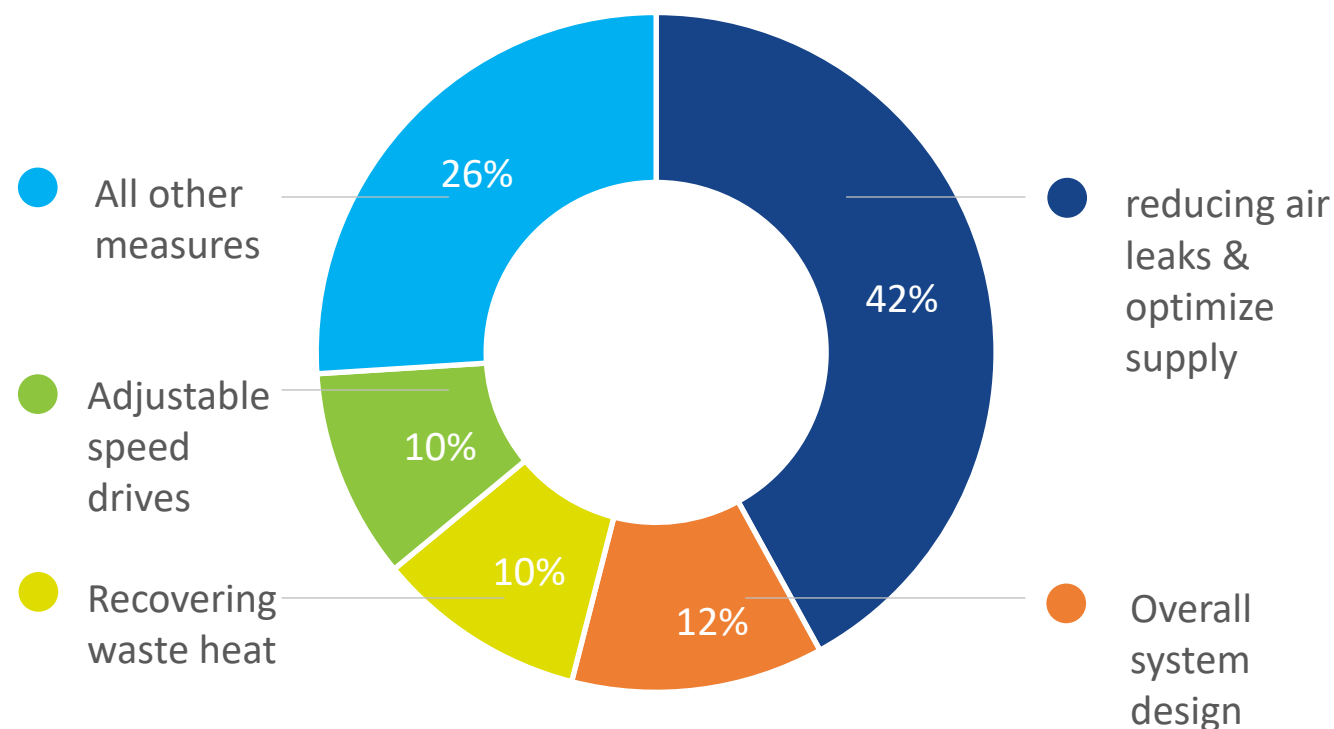
Up to 30% of electricity costs

Savings potential up to 50%

Pressure band width is critical:

- Quality of glass
- Continued production

Major energy saving measures



A background image showing the glass bottle manufacturing process. Molten glass is being poured from a spout into two molds held by a mechanical arm. The glass is glowing orange-red from heat. The machinery is dark and industrial.

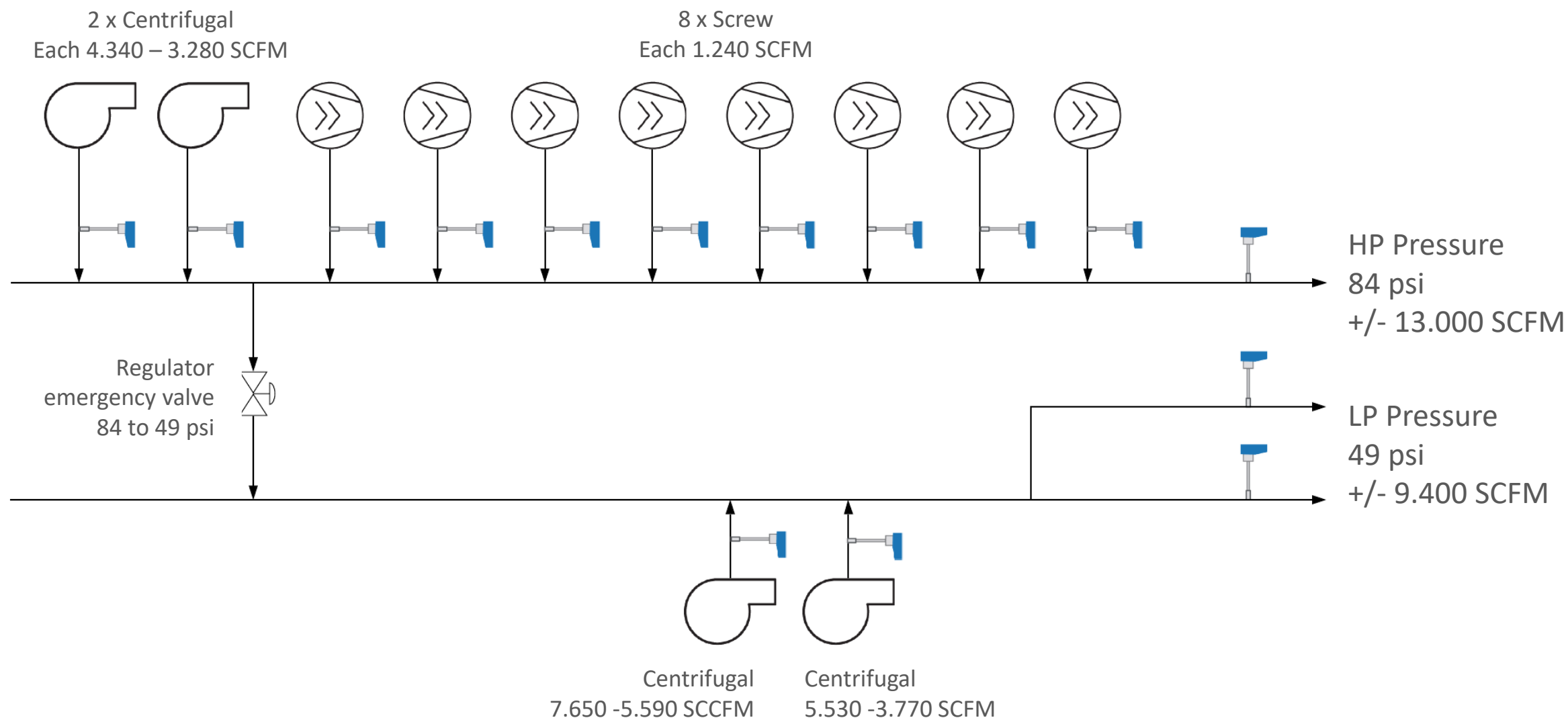
Compressed air system lay out

Low pressure
High pressure

@ 49 psi
@ 84 psi

av. consumption 9.400 SCFM
av. consumption 13.000 SCFM

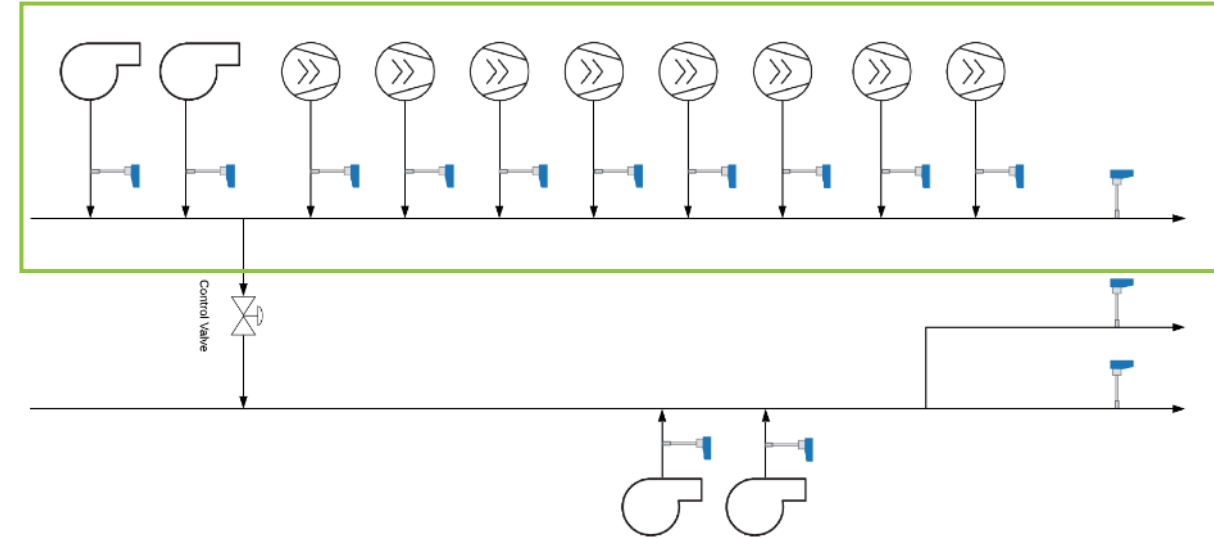
Compressor room lay out - before



Before implementation

High pressure system:

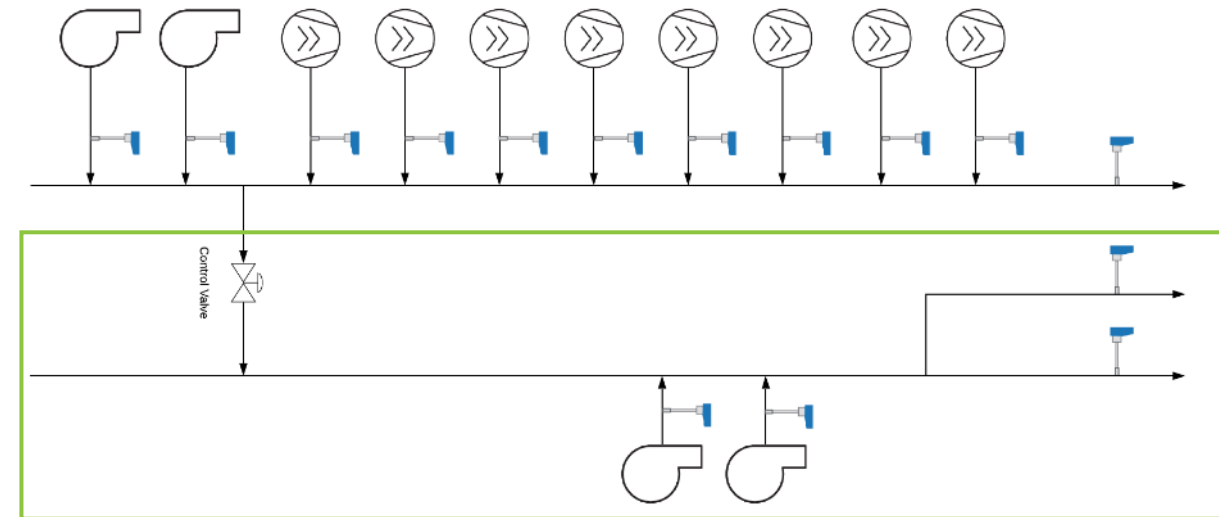
- Both centrifugal air compressors always running full load.
- Screw compressors started @ 84 psi: resulting in pressure fluctuations: 81,75..85,40 psi.
- Unloaded hours on screw compressors.
- Emergency regulator: only activated when pressure drops in LP system to 46,7 psi.
- Flow meters installed in 2013 + only for indication: observe flow/HP/h consumption.



Before implementation

Low pressure system:

- LP compressor: maintaining 49 psi in main header.
- Compressors running without communications but on same system pressure transmitter.
- No loadsharing.
- Occasional blow off.



How do we add value

✓ Install & connect flow meters

✓ Install booster compressor

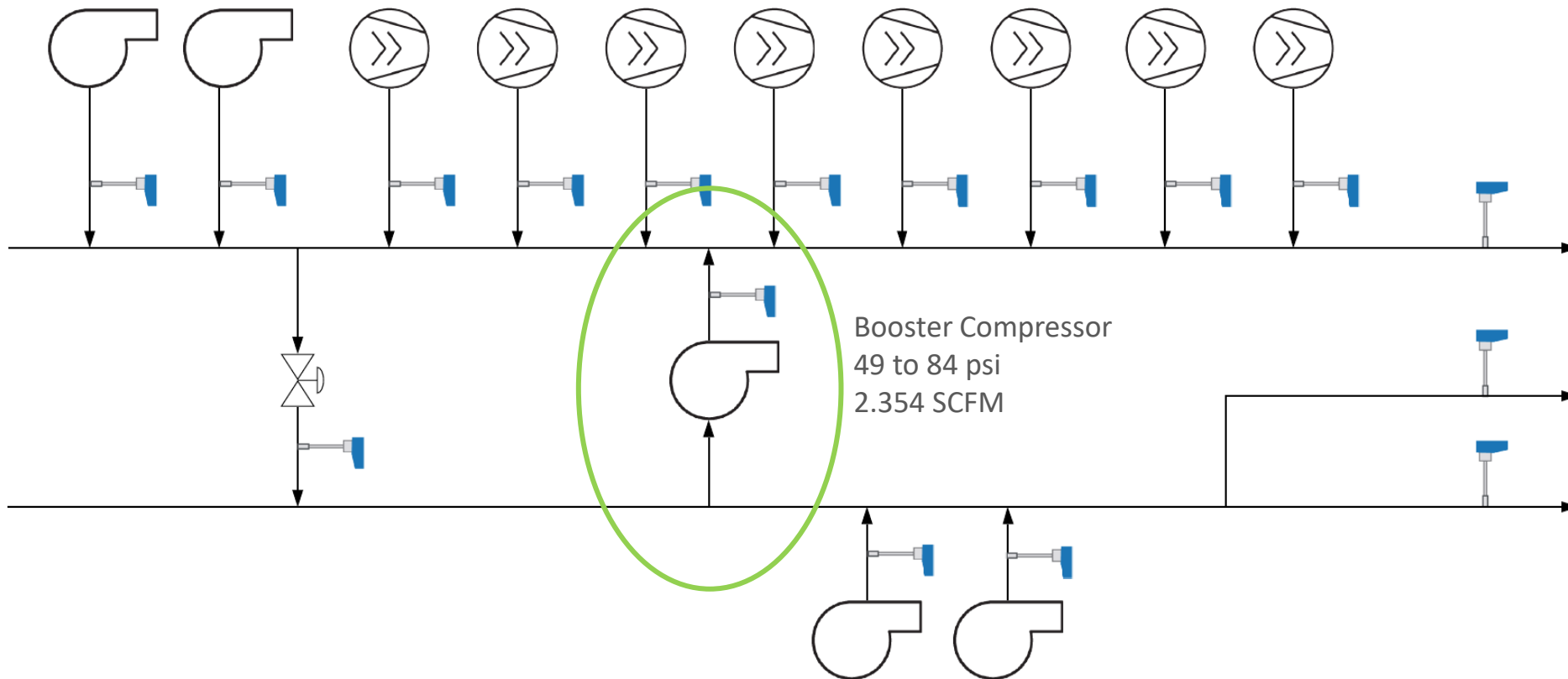
✓ Modify regulator valve

✓ Install Master controller

Energy savings !



Compressor room lay out - improvements

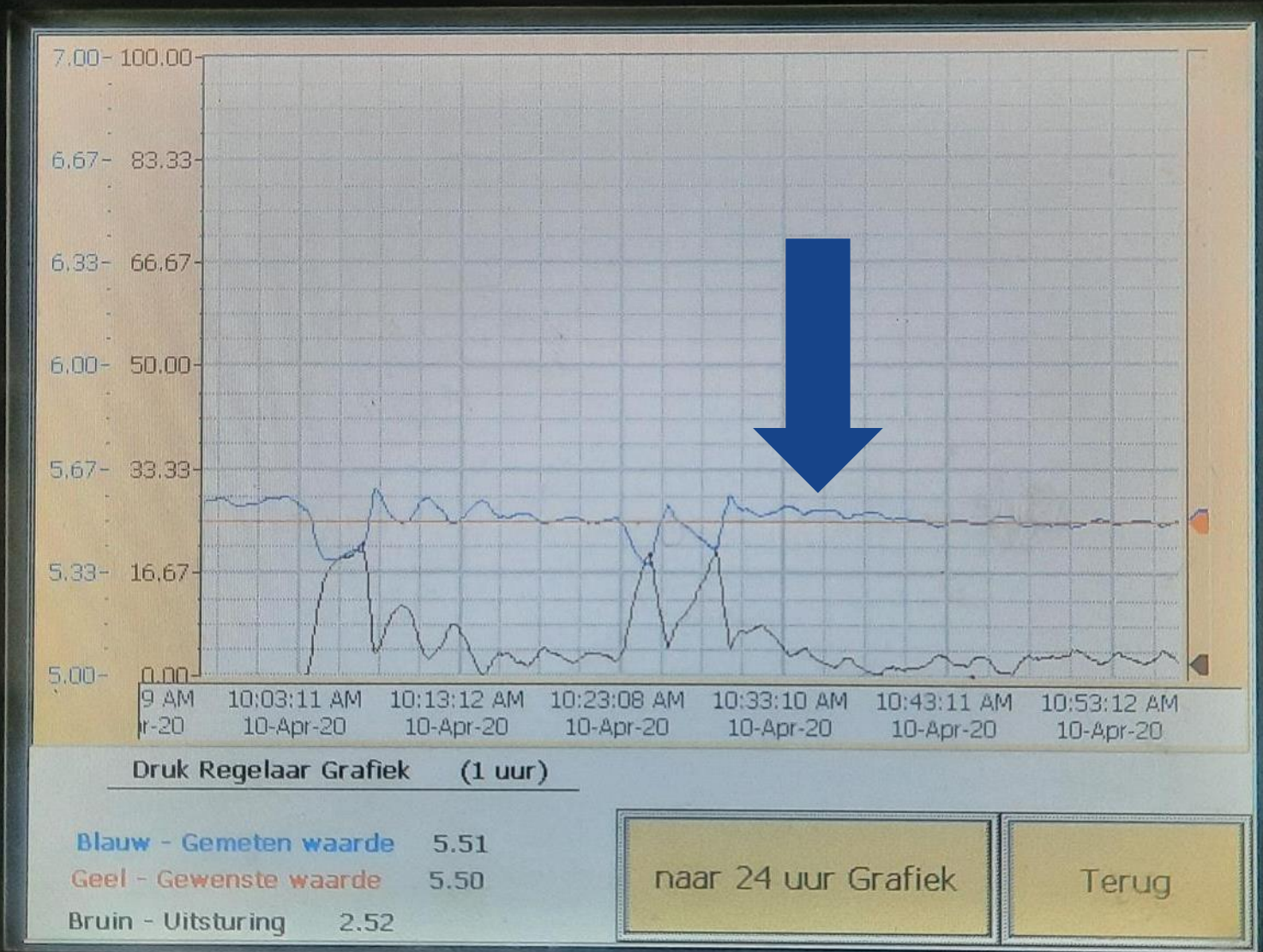


Requirement from customer

- LP system is most critical. Pressure 49 psi. Dev. +/- 0.7 psi.
- Energy savings @ maximum when booster compressor is running full load.
- Energy savings @ maximum when screw compressors are only running full load.
(implemented at phase 2)
- When one of the low pressure units trips actions:
 - Booster should unload and stopped.
 - Screw compressors starts up depending on the needed flow.
 - Emergency regulator valve should open to maintain the low pressure.

1st Phase implementation results

- Installation centrifugal booster : capacity 2.354 SCFM.
 - Booster feeds the HP system: 3 screw compressors are not needed
- Rebuild LP + HP compressors to a new control system including load sharing.
- Rebuild existing control from emergency control valve to Stork controller.
- Use flow meters to control demand to booster.



Energy savings :
294 kW/hr.
\$ 151.500

Just the beginning....





THANK YOU!

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